HAIR STYLING APPLIANCE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a hair styling appliance. More particularly, the present invention relates to a hair styling appliance having a glass working surface for contacting, heating, straightening and/or shaping hair.

2. Description of the Prior Art

Heated hair may be smoothed, manipulated, and styled more easily that non-heated hair. There are numerous hair styling tools and appliances for heated styling of hair. Such hair styling tools and appliances include hair curlers and plate straighteners of various configurations having a variety of features.

A typical feature of these hair styling tools and appliances includes a metallic heating surface. The metallic heating surface is heated by either an internal or external heating source. The metallic heating surface, once heated, is applied to hair being styled. Ceramic surfaces have also been used for providing the heating surface of known hair styling tools appliances

The metallic and ceramic material heating surfaces act as a thermal conductor for transferring heat generated by the heat source from the heat source to the hair being

styled. While providing the requisite heat transfer functionality to a certain extent, the metallic and ceramic heating surface materials provide a level of frictional resistance to the hair being treated that can damage the hair. The frictional resistance can be attributed to surface imperfections and surface variances on the metallic and ceramic surface materials.

Microscopic surface variations can snag, shear, and damage hair. Polishing the metallic and ceramic heating surfaces may be accomplished, but at a high economic cost.

Therefore, there exists a need for a hair styling appliance that heats hair efficiently in a controlled manner without physically damaging the hair being styled.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a hair styling appliance having a handle with a glass working surface.

It is another object of the present invention to provide such an appliance that has superior and/or improved heat transfer to hair being styled.

It is yet another object of the present invention to provide such a hair styling appliance having a smooth working surface.

It is a further object of the present invention to provide a hair styling appliance having opposing handles with smooth working surfaces of different materials.

It is a still further object of the present invention to provide such a hair styling appliance having a heater in thermal communication with at least one smooth working surface for heating the smooth working surface.

These and other objects and advantages of the present invention are achieved by a hair styling appliance that has a first handle, a second handle operatively connected to the first handle, a glass working surface on at least one of the first and second handles, and a heater in the at least one of the first and second handles for at least heating the glass working surface.

The hair straightening appliance may have the glass working surface thereof on both of the first and second handles. The glass working surface on the first handle relatively opposes the glass working surface on the second handle.

The hair straightening appliance may provide a substantially planar, smooth working surface and/or a textured or patterned smooth working surface.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of an exemplary embodiment of the hair styling appliance of the present invention;

FIG. 2 is a top plan view of the hair styling appliance of FIG. 1, but rotated 180 degrees;

FIG. 3(a) is a sectional view of an exemplary hair styling appliance of the present invention, including a retainer for maintaining the smooth working surface in thermal contact with a handle thereof;

FIG. 3(b) is a sectional view of an exemplary hair styling appliance of the present invention, including an adhesive for maintaining the smooth working surface in thermal contact with a handle thereof;

FIG. 4(a) is a side view of an exemplary hair styling appliance of the present invention, including a heater;

FIG. 4(b) is a detailed view of the heater of FIG. 4(a);

FIG. 4(c) is a partial, exploded detail view of the heater of FIG. 4(a);

FIG. 5(a) is a side view of an exemplary hair styling appliance of the present invention, including an alternative heater;

FIG. 5(b) is a detailed view of the heater of FIG. 5(a);

FIG. 5(c) is a partial, exploded detail view of the heater of FIG. 5(a);

FIG. 6(a) is a side view of an exemplary hair styling appliance of the present invention, including an alternative heater;

FIG. 6(b) is a detailed view of the heater of FIG. 6(a); and

FIG. 6(c) is a partial, exploded detail view of the heater of FIG. 6(a).

DETAILED DESCRIPTION OF THE INVENTION

Referring to the figures and, in particular, Figs. 1 and 2, there is shown a side and top view, respectively, of an exemplary hair styling appliance in accordance with the teachings of the present invention, generally represented by reference numeral 5. Hair styling appliance 5 has a handle 10 and a handle 15. Handle 10 has a distal or free end 12, and likewise handle 15 has a distal or free end 16. Handle 10 and handle 15 are operatively connected to each other at a junction or pivot area 30. Junction 30 can be any suitable connector and/or connecting device or system, including for example, a hinge, a ball and socket joint, a pivot pin, etc.

Handles 10 and 15 are operative to move between a closed position (shown in the figures herewith) and an open position (not shown). Positioned in the open position, handles 10 and 15 are spaced apart at ends 12 and 16, respectively, while still connected at junction 30. Positioned in the closed position, handles 10 and 15 are spaced at their closest distance to each other. Preferably, handles 10 and 15 meet (i.e., touch) or nearly touch when in the closed position.

Handle 10 and/or handle 15 preferably have a working surface 20 and 25, respectively, thereon. The surface is referred to as a working surface herein since the material is provided for contacting and transferring heat from the

hair styling appliance to hair styled (i.e., being worked) using the hair styling appliance of the present invention. The surface 20 is on a surface of handle 10 that faces handle 15. Likewise, surface 25 is a surface on handle 15 that faces handle 10.

In the embodiments illustrated in the accompanying figures, working surfaces 20, 25 are smooth surfaces. Preferably, the smooth working surfaces 20, 25 are glass surfaces.

Smooth working surface 20 preferably opposes glass working surface 25, with both preferably being glass, hair placed between smooth working surfaces may be styled, selectively and/or exclusively by hair contacting the smooth working surfaces.

In an aspect of the present invention, the glass working surfaces of the present invention provides an extremely smooth working surface for use in styling hair. The smoothness of glass working surfaces 20, 25 mitigates the likelihood of hair styling appliance 5 snagging, shearing, tearing, or otherwise physically damaging hair coming into contact with the glass working surfaces during the process of styling hair. Glass working surfaces 20, 25 are preferably substantially free of pits and other surface features that can contribute to roughness of the surface. In particular, surface features that can typically snag, shear, tear or otherwise physically damage hair are preferably avoided in glass working surfaces 20, 25,

thereby making the glass surfaces extremely smooth in comparison to the working surfaces of known prior art metal and ceramic hair styling appliances.

The glass surfaces 20, 25 of the present invention may have a surface roughness average (i.e., Ra) less than about 13,000 Ra(Å), which is the typical Ra value for a ceramic coating. Preferably, the Ra value glass surfaces is less than about 5,200 Ra(Å), which is the typical for a real ceramic (solid). A more preferable surface roughness average for glass surfaces 20, 25 is less than about 4800 Ra(Å), which is the typical Ra value for an anodized aluminum. A preferable surface roughness average for glass working surfaces 20, 25 is in the order of about 180 Ra(Å). The notation Ra(Å) indicates that the unit of measure for the stated roughness average is Angstroms.

According to the above example, glass surfaces 20, 25 are about twenty-seven (27) magnitudes smoother than anodized aluminum, twenty-nine (29) magnitudes smoother than the solid ceramic, and about seventy-two (72) magnitudes smoother than the ceramic coating. Thus, glass working surfaces 20, 25 can provide a much or extremely smooth working surface for heating and styling hair styled by hair styling appliance 5.

The relative smoothness of the glass working surfaces 20, 25 compared to other surface materials highlights some of the advantages of providing the glass working surfaces

for styling hair using hair styling appliance 5. The glass working surfaces provide a smooth, superior working surface that is less rough and potentially damaging on the hair being styled.

In an aspect of the present invention, glass working surfaces 20, 25 may have the exemplary chemical composition of C(7.5%), O(32.6%), Na(6.8%), Mg(1.9%) Al(0.5%), Si(41.2%), K(0.5%), and Ca(9%).

The specific composition and physical characteristics of glass working surfaces 20, 25 may be varied to, for example, alter certain properties of glass working surfaces 20, 25. Examples of the properties that may be varied include, for example, the heat transfer ability of glass working surface 20, 25. The shape and/or thickness of glass surface 20, 25 may be varied to adjust the thermal conductivity, color, light reflectivity, hardness, resistance to breaking, and/or other aspects of glass working surfaces 20, 25.

The width of glass working surfaces 20, 25 (see Fig. 2, arrow 100) may preferably vary from about 0.25 inches to about 3 inches. Glass working surfaces 20, 25 having a width of 0.75 inches and 2 inches are preferred working surface width sizes. The width of glass working surfaces 20, 25 may be varied for various considerations such as, for example, the weight, size, and maneuverability of hair styling appliance 5.

The glass working surface(s) of the present invention can encompass glass, glass-type materials, and other surface materials, although glass is preferred. A pertinent aspect of the present invention is the smoothness of the working surface of hair styling appliance 5. Accordingly, a suitable material for use in or as the coating for surfaces 20, 25 should have a roughness average (i.e., smoothness) comparable to glass, as defined above.

In an aspect hereof, the working surface (including glass and other materials) may have a coating, such as, for example, an anti-static coating and/or an acrylic coating applied thereto. Whether an anti-static, an acrylic, or other type of coating applied to the working surface, the coating preferably does not detract from the smoothness of the working surface to which it is applied. In fact, the coating should improve, if possible, the roughness average over a glass surface.

In another aspect hereof, working surfaces 20, 25 preferably have substantially planar opposing faces when disposed on handles 10, 15, respectively. Optionally, working surfaces 20, 25 can have non-planar opposing faces that matingly engage with each other (e.g., wave-shaped plates). Whether working surfaces 20, 25 have substantially planar opposing faces and/or non-planar opposing faces that matingly engage with each other, the opposing working surfaces 20, 25 provide an exceptional contact interface with each other and hair placed between the working surfaces.

The smoothness of the working surfaces (i.e., lack of surface variances and roughness) also contributes to the exceptional contacting and heat transferring characteristics of the opposing working surfaces. Thus, hair styling appliance 5 exhibits improved heat transfer between the opposing working surfaces 20, 25 due, at least in part, to the improved contact area provided at the interface of the opposing, smooth working surfaces 20, 25 and hair disposed therebetween.

The smooth working surfaces 20, 25 may be selectively removable. Advantages of having removable plates include the capability to interchange working surfaces of differing sizes, shapes, thickness, color, and etc.

As illustrated in Fig. 3(a), glass working surfaces 20 (25) can have a mirrored surface 95 positioned between handle 10 (15) and the glass working surface. The mirrored surface can be adhesively affixed to the glass working surfaces 20 (25) to prevent the glass working surface from becoming displaced from handle 10 (25) in the instance the glass working surface is broken. Also, the reflectivity provided by mirrored surface 95 may be viewed through glass working surface 20 (25).

In an aspect of the present invention, hair styling appliance 5 has a number of controllers for controlling a

number of operational aspects of hair styling appliance 5. For example, as best seen in Figs. 1 and 2, on/off switch 35, including an "on" button 40 and an "off" button 45, is used to selectively turn hair styling appliance 5 on and off, respectively. Lamp 60 preferably provides a visual indication of the on/off. Optionally, lamp 60 provides the heating state of hair styling appliance 5. For example, when hair styling appliance 5 is "on" and heating to the selected temperature, lamp 60 intermittently blinks.

Thumbwheel 50 is provided for controlling the temperature setting of hair styling appliance 5. Thumbwheel 50 is preferably at least partially concealed by one of handles 10, 15. In this manner thumbwheel 50 is not obtrusive and the setting thereof is less likely to be inadvertently changed. Thumbwheel 50 may control the heating of hair styling appliance 5 to a number of different temperature settings. The number of temperature settings may range from, for example, two to greater than twenty-five different temperature settings.

In an aspect hereof, the temperature settings may be generally characterized into a low setting, a medium setting, a medium-high setting, and a high setting. Each temperature setting may encompass more than one of the number of temperature settings provided for selection by temperature setting thumbwheel 50.

In one aspect hereof, the selected temperature setting can be momentarily (i.e., temporarily) increased a number of degrees to provide an additional burst of heat above the selected temperature setting. The amount of the temperature increase may be fixed and/or variable depending on a selected preference and/or the selected temperature. This feature may be implemented by, for instance, a "turbo" control (not shown) located on either one or both of handles 10, 15. The turbo control can, optionally, be incorporated as an additional feature of on/off switch 35, temperature setting control 50, or other controls of hair styling appliance 5. For instance, the turbo control could be optionally incorporated into temperature setting control 50 and activated by depressing the temperature setting control.

Regarding the temperature setting of hair styling appliance 5, it is preferable that the heating of the hair styling appliance to the selected temperature occur in a very short amount of time, notwithstanding the selected temperature. Preferably, the time to heat hair styling appliance 5 to the selected temperature is less than sixty seconds from a cold start, and most preferably the time to heat hair styling appliance 5 to the selected temperature is less than thirty seconds from a cold start.

In a aspect of the present teachings, hair styling appliance 5 has a flocked outer surface 75. Flocked outer surface 75 can be brought into contact with hair to add an additional shine to the hair. Flocked outer surface 75

operates to smooth and add shine to hair brought into contact therewith. Flocked outer surface may be constructed of a cloth-like material such as, for example, a felt material. The inclusion of flocked outer surface 75 is optional.

Referring to Fig. 3(a), there is shown a sectional view of an exemplary hair styling appliance 5 of the present invention. In particular, a retainer 12 for maintaining smooth glass working surface 20 in thermal contact with handle 10 is depicted. Retainer 12 provides a retaining edge or lip that maintains smooth and/or glass working surface 20 in contact with handle 10. In this manner, glass working surface 20 may be thermally heated upon heating by a heater 85 disposed in handle 10. Heat generated by heater 85 is thermally conducted to handle 10 and thereafter to glass working surface 20. Preferably, the transfer of heat from heater 85 to handle 10 is controlled and confined to the area in contact with glass working surface 20.

Referring to Fig. 3(b), there is shown a sectional view of an exemplary hair styling appliance 5 of the present invention having an adhesive 90 for maintaining smooth and/or glass working surface 20 in thermal contact with handle 10. Adhesive 90 provides the holding power that maintains working surface 20 in contact with handle 10. In this manner, glass working surface 20 may be thermally heated upon heating by a heater 85 disposed in handle 10. Heat generated by heater 85 is thermally

conducted to handle 10 and thereafter to working surface 20. Preferably, adhesive 90 is thermally conductive and the transfer of heat from heater 85 to handle 10 is controlled and confined to the area in contact with glass working surface 20.

Referring to Figs. 4(a) to (c), a rope heater assembly 105 is constructed of a resistance wire wound around a glass fiber rope and insulated with glass fiber tubing. The rope heater is located between insulating mica plates 110, an aluminum heat spreader 120, and retainer 12. Aluminum heat spreader 120 operates to disperse heat generated by rope heater assembly 105. The rope heater is tensioned into contact with glass working surface 20 by a device, preferably a spring 115.

Figs. 5(a) to (c) are an exemplary hair styling appliance of the present invention having a PTC (positive temperature coefficient) heater. The PTC heater is constructed of a semi-conductive ceramic 130, having a resistance that varies with a temperature change. The PTC heater assembly 125 includes PTC semi-conductive ceramic 130 between conductors 135. PTC material 130 and conductors 135 are enveloped by a high temperature, polymid tape 140. PTC heater assembly 125 is maintained in position against retainer 12 and glass working surface 20 by a spring 140.

FIG. 6(a) to (c) are an exemplary hair styling appliance of the present invention having a mica heater

assembly 150. Mica heater assembly 150 is constructed of a wire wound mica plate 165, and insulated with additional mica plates 170. Mica plates 170 envelop a contact/heat spreader 175. Flexible mica layers insulate the heater. Mica heater assembly 170 is maintained in contact with working surface 20 by virtue of conventional devices, preferably retainer 12 and spring 180.

It should also be appreciated by those skilled in the art that the particular hair styling appliance functions and other aspects of the teachings herein are but examples of the present invention. Thus, they do not limit the scope or variety of applications that the present invention may be suitably implemented. Thus, it should be understood that the foregoing description is only illustrative of a present implementation of the teachings herein. Various alternatives and modification may be devised by those skilled in the art without departing from the present invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications, and variances that fall within the scope of the disclosure herein.